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Continuous boundary layer structure monitoring using CL31 Ceilometer

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The planetary boundary layer (PBL), even though the lowest part of the troposphere is actually one of the most important part to be studied since is directly influencing air pollution together with urban emission source strengths, traffic emissions and weather. The presence of aerosols and clouds within the PBL allows monitoring of the layers using active remote sensing instruments such as ceilometers. A major advantage of this instrument is that it measures continuously and over a large vertical range. The aim of the paper is to accurately assess the structure of the boundary layer, including the PBL height, using Vaisala Boundary Layer View (BL-VIEW), an application software for planetary boundary layer analysis, considering also the meteorological conditions. The BL-VIEW calculation is based on the gradient method. Measurements were performed at the Faculty of Physics, Bucharest -Magurele, Romania (26.029E, 44.348N, ASL: 93m). Ceilometer backscatter coefficient profiles were analyzed for a period of six months (2016 October – March 2017). Results obtained from the CL31 ceilometer and ECMWF (European Center for Medium-Range Weather Forecast) data showed a good agreement regarding PBL height. Both local traffic and long transported aerosols proved to influence the variability of the PBL height.